

Birds as enemies of mining larvae in South Hampshire.

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No one who has searched in the spring for the larvae or pupae of those insects that mine in stems, twigs, and stumps can fail to have noticed plain signs of the ravages of birds among these species: but it is only after more systematic observation that these ravages are appreciated to their full extent. These notes make no claim to completeness, but aim at giving some account of the activities of birds during the winter among certain larvae—chiefly Aegeriid larvae—in the district around Southampton.

Perhaps our commonest Aegeriid is *Synanthedon culiciformis*, L., which abounds in every copse where birch is more or less regularly cut. By November the full-fed larvae are resting in their cocoons, which are rarely found very deep in the wood of the stump, and frequently between the bark and the wood. The exit hole is often sealed with a silken cap which is not difficult to detect when it is placed on the flat cut surface of the stump. Frass in plenty, extruded chiefly between the bark and the wood, betrays the stump that contains larvae. By January the stumps are nearly one year old and are beginning to get rotten, so that birds have no great difficulty in pecking the stump almost to pieces and extracting a large percentage of the larvae, especially those that are not very deep in the wood. I am still unable to name the bird responsible for these attacks, but it is not rare to surprise the large green woodpecker hunting on the ground among the birch stumps in the wood, so that very likely he is the culprit, or one of them. It would not be surprising either, to learn that pheasants sometimes pecked out these decaying stumps, but so far all attempts to catch the spoiler in the act have met with no success.

Another Aegeriid, one that occurs probably in all our alder swamps, and certainly in at least half a dozen localities in this neighbourhood, is *Synanthedon spheciformis*, S. & D. Like all the species of this group, it seems to have years of maximum abundance followed by years when it almost disappears. In 1923 it reached the highest point of its curve since I have lived in this district, and in some of the alder bottoms large numbers of young stems contained a larva or two, and sometimes as many as six borings occurred in stems of less than two inches in diameter. Several entomological friends were anxious to take this species and were duly informed that larvae could be had in plenty, but all save one chose to wait until May before coming to cut out the stems. As I had already taken a good series on the wing and bred a fair number, I reserved the best locality, where in the spring of 1922 I had noted the frass of large numbers of first year larvae not only at the roots of young alders but also in two cases at the roots of young birches. When on April 8th the first visit of the season was made to this alder swamp, it was found that practically every stem had been attacked by birds with one of two results; either a ragged hole showed where the bird had pierced to the mine and extracted the larva, or else a clean-cut exit hole showed the end of the mine, and in all these latter cases the larva was gone, as was proved by repeated experiment. With much searching, a dozen or more larvae were found, but many hundreds had been destroyed. The bird responsible is most probably a woodpecker, for it must possess a long tongue which it can insert in the boring in order to extract the larva. In other

localities also traces of the attacks of birds were commonly seen, and such attacks had not always been successful, for on Feb. 22nd I found a stem, which showed where a bird had made two attempts three inches apart, and had pierced to the mine twice without succeeding in extracting the larva. It is difficult to say how the bird discovers a tenanted stem in the case of this species. The frass ejected is nearly always hidden by moss or grass growing round the roots, and the position of the exit hole is only rarely to be distinguished even by the closest search. As proof that the bird has trouble in finding the end of the mine, which is covered by thin bark, may be cited the fact that in all cases where the exit hole has been laid bare, a number of beak marks varying up to thirty or even more can be counted on the stem. Judging by the appearance of the pecked-open mines, the task must often have taken several hours at least, for the mine is nearly always in a living stem; only very rarely does the stem die before the insect emerges, though it frequently dies afterwards.

Another Aegeriid which is widely distributed in Hampshire though not abundant is *Synanthedon andrenaeformis*, Lasp. I have often noted pecked-open mines of this species in Buckinghamshire, where it is much more common, but it was at Shawford near Winchester, a locality where a friend and myself once found more than forty capped mines in a single morning, that the attacks of birds were first noted as a serious menace to this species. One bush of *Viburnum lantana* was seen on which were twelve pecked-out mines and not a single good one. The same two methods are adopted by the bird as in the case of *S. spekeiformis*; either the twig is ripped open or the cap torn off, leaving the exit hole gaping. In the first case, which is by far the more usual, the mine is always empty, but in the second case it is not invariably so, and it may be that sometimes the cap is removed by some other agency, for it is not very firmly fastened as a rule. It should be noted that beak marks are usually numerous in both cases, which would seem to prove that the bird does not hunt by sight alone, for the cap is plainly visible. Usually only the mines in fairly thin young shoots are attacked. Probably the bird mainly responsible is some species of tit, which is unable to penetrate the hard wood of older stems.

Every red currant bush of any age in every garden in Southampton probably contains each winter the larvae of *Synanthedon tipuliformis*, Clerck. There are two ancient bushes in my garden from which every year in December I can cut a dozen or more mines, but if the search is left until later in the winter, it is found, as in January, 1925, that these mines have been ripped open for a distance of from two to four inches, nearly the whole length of the mine, and that the larvae are gone. Though I have not yet witnessed the act, it is almost certain that blue tits are the culprits, for they are very common here and are frequently seen in the fruit trees and bushes. Mines in soft wood of the season's growth are attacked, and those in harder old wood are left untouched. The mine is probably discovered by the frass extruded.

Synanthedon formicaeformis, Esp., occurs on Baddesley Common near Southampton and at New Milton and Christchurch in the south of the county. In the first locality it mines in large stems up to several inches in diameter, and is much attacked by birds which peck out large holes in their efforts to reach the larvae; at New Milton it forms galls on smaller stems and is also very frequently pecked out by

birds. In both cases frass is visible in greater or less quantity and the gall in the second case also betrays the presence of larvae. The marks made by the bird's beak can be counted on the stem, showing how the bird sought for the best place to begin operations. In December, 1926, large numbers of pecked-out mines were found at New Milton, and not a single mine in a moderately thin twig was found intact. The mines in thicker stems are also often attacked and the gall is pecked to pieces or a hole made immediately above it. One such mine in a stem of half an inch in diameter shows more than thirty testing beak marks, and the hole made is 25mm. long and 7mm. wide. The mines situated high up on the willows suffered most, while those quite close to the ground and hidden by long grass and sedge were intact.

The newly discovered British Aegeriid, *Synanthedon flaviventris*, Stgr., suffers perhaps worst of all from the attacks of birds. As nearly every mine is in two year old willow shoots, and always situated much too high to be hidden by any undergrowth, there is no protection of any kind. While the large number of galls of different species commonly found on willow only serves to encourage birds in their patient search. Already in the winter of 1925-6 I noted a number of mines ripped open, and in 1926-7 I found a larger number of old mines of the previous year that had been pecked open by the birds. But in the winter of 1927-8, when mines of this species were first found in any number, I realised what a high percentage of the larvae perish in this way, for by the end of October mines in very thin stems were found pecked open, and by December the number of mines destroyed had increased very considerably. It is certain that by April, especially if a spell of frosty weather comes, nearly every mine will have been investigated, and only those overlooked by the birds will remain to reward the patient entomologist. Almost certainly these mines are found by sight, for no frass is visible, and the gall is no more difficult to see than that made by the various species of gallflies on willows, which are also readily discovered and pecked open by birds. The birds noted as often seen searching among the willow bushes are the different species of tits, especially the coal tit and the marsh tit, but positive evidence is so far lacking.

Another species of lepidoptera that forms a gall in shoots of willow, this time in one year old shoots, and that suffers very severely from the depredations of birds, is *Grapholitha serrillana*, Dup. The insect is comparatively abundant in this locality, but it is nearly a hopeless task to search for mines later than January, and even in November at least 50% of the mines found will be those that have been recently pecked open, though it must not be forgotten that these damaged mines are very much more readily seen than are good ones. The curious oval flattened malformation, so often seen on willow shoots, appears to be the plant's attempt to heal the wound made by the bird as it pecks out the mine of this species. Probably the coal tit is again the culprit, or one of them. Many times I have watched him questing through the willows, and disturbed him from among them. Often a pair have protested excitedly against my invasion of their hunting grounds, but so far my patience has not been rewarded with a sight of the ravager at work.

It is difficult to give a reason why *Synanthedon respiformis*, L., should be entirely free from these attacks, yet this seems to be the case. The insect is very common in this district, and yet no

single instance of any attack on its larva by birds has so far been noted, though plenty of frass betrays its whereabouts. Two possible reasons are suggested: it may be that the oak stump offers too great a resistance, for the bark can only be prised away, and the larva exposed, by the exercise of considerable force; or it may be that the larva is generally too small in the winter to be worth bothering about from a bird's point of view, for we collectors do not take these larvae before May, and even then we find many of them not yet full fed. Whatever may be the reason, this species, so far as I know, is immune from the attacks of birds.

The only other stem feeding Aegeriid found here is *Sphecia crabroniformis*, Lewin, which is not uncommon in old sallows of considerable growth. Only very rarely have I noted any attempt to peck out this larva, which feeds too deeply in the wood and too low down in the stem and roots to be vulnerable. It comes near the bark of the stem only just before pupation in June or later, and at that season the birds are not hard pressed by hunger as they are in the depths of winter.

A number of coleopterous larvae feed in stems and are more or less subject to the attacks of birds. The most conspicuous example in this district is *Saperda populnea*, L., which makes galls in small stems and branches of aspen and willow. The swelling is easy to see and few pecks are needed to show the exact position of the larva. Aspen is not a hard wood and the labour involved in extracting the larva is not very great, so that large numbers of these larvae are destroyed. Of the coleopterous larvae, which feed in dead and decaying branches of trees, for example *Mesosa nebulosa*, Fb. (*nubila*, Oliv.) and *Strangalia maculata*, Poda, (*armata*, Herbst.) large numbers are extracted by birds, their chief enemies being probably woodpeckers.

Unerring skill is displayed by the birds in their search for a tenanted mine. One often finds mines of one or another species of Aegeriid, which appear to be good, but which have been examined by birds, as the marks of their beaks on the stem plainly testify. Yet the birds have not pecked these mines open, and it is usually found on examination that such mines no longer contain a living larva. The degree of persistence displayed by the birds undoubtedly depends very largely on the severity, or otherwise, of the weather during the winter months, and on the consequent scarcity or abundance of other kinds of food. It would probably be admitted even by the most sentimental of bird-lovers that tits have increased beyond all reasonable proportion in Hampshire since the last severe winter in 1916-17, due to the constant war waged by the gamekeeper on their natural enemies. Those who make a practice during severe weather of providing some food for them in the shape of coconuts, suet and sunflower heads might reasonably be expected to provide for all their wants during the winter, so that the whole burden of feeding them and not merely a very casual part of it falls upon the shoulders of those who take such pleasure in it. Every tit in the neighbourhood would be a regular visitor and would not then spend much time and labour in pecking out larvae from stems and twigs, so that our native Aegeriids would perhaps suffer less from this disturbance of nature's balance. Finally, I should be very interested to know if the experience of others is the same as mine, and to learn any further details observed concerning the ravages of birds on the larvae of the species mentioned and on other similar species.